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09/779,763	02/08/2001	Michael A. B. Parkes	206965	4650

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EXAMINER	
ALI, SYED J	

ART UNIT	PAPER NUMBER
2127	

DATE MAILED: 09/08/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/779,763	PARKES ET AL.	
	Examiner	Art Unit	
	Syed J Ali	2127	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-5,7-17 and 19-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-5,7-17 and 19-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date JULY 2, 2004; JULY 6, 2004
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. This office action is in response to the amendment filed July 2, 2004. Claims 1-5, 7-17, and 19-41 are presented for examination.

2. The text of those sections of Title 35, U.S. code not included in this office action can be found in a prior office action.

Claim Rejections - 35 USC § 103

3. **Claims 1-4, 12-14, 19, 22-23, 25-33, and 36-38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (USPN 6,263,358) (hereinafter Lee) in view of Choquier et al. (USPN 5,768,515) (hereinafter Choquier).**

4. As per claim 1, Lee teaches the invention as claimed, including a method of performing a task on a computer system, wherein the task comprises a plurality of sub-tasks, the method comprising:

(a) instantiating a plurality of stages, the plurality of stages comprising at least one stage for each of the plurality of sub-tasks (col. 3 lines 11-25; col. 22 lines 1-19), each stage comprising:

a holding area (col. 3 lines 11-25; col. 22 lines 1-19); and

a scheduling policy (col. 3 lines 11-25; col. 22 lines 1-19);

(b) receiving a plurality of requests for the task (col. 8 lines 26-48);

(c) for each of the requests, storing in a work packet data for performing a sub-task of the task (col. 29 lines 31-55);

(d) storing each sub-task in the holding area of the at least one stage for the sub-task (col. 8 lines 26-48);

(e) executing the sub-task on each of the work packets in the holding area in accordance with the scheduling policy of the at least one stage for the sub-task while refraining from executing other sub-tasks of the task (col. 3 lines 11-25; col. 22 lines 1-19; col. 29 lines 31-55); and

(f) repeating steps c, d, and e for each sub-task of the task until all of the sub-tasks of the task are completed for each request (col. 29 lines 31-55; col. 30 lines 5-12).

5. Choquier teaches the invention as claimed, including the following limitations not shown by Lee:

the computer system having a cache (col. 4 line 54 - col. 5 line 3); and

maintaining locality of instructions and data in the cache (col. 4 line 54 - col. 5 line 3).

6. It would have been obvious to one of ordinary skill in the art to combine Lee with Choquier since Choquier accounts for deficiencies of Lee, including repetitive executing of similar tasks, by maintaining information regarding an application in cache. This allows processing throughput to be increased, by reducing overhead costs incurred fetching and storing data from main memory, which can be a time consuming process. Since Lee is related to network tasks, this is of even greater importance since the amount of time required to send data over a network is vastly greater than a cache read.

7. As per claim 2, Lee teaches the invention as claimed, including the method of claim 1, wherein each sub-task has a type of work packet defined for it, wherein the work packet defined for the sub-task includes data and functions for performing the sub-task (col. 29 lines 31-55).

8. As per claim 3, Lee teaches the invention as claimed, including the method of claim 1, wherein the holding area is a queue (col. 3 lines 11-25; col. 22 lines 1-19).

9. As per claim 4, Lee teaches the invention as claimed, including the method of claim 1, wherein the holding area is a stack (col. 3 lines 11-25; col. 22 lines 1-19).

10. As per claim 12, Lee teaches the invention as claimed, including a method of performing a task on a computer system, wherein the task comprises a plurality of sub-tasks, the method comprising:

creating an instance of a stage for each sub-task, wherein the stage comprises:

a holding area (col. 3 lines 11-25; col. 22 lines 1-19); and

a scheduling policy (col. 3 lines 11-25; col. 22 lines 1-19);

placing one or more work packets in the holding area, each work packet corresponding to an iteration of the sub-task required for the task and containing data for performing the sub-task (col. 29 lines 31-55; col. 30 lines 5-12); and

performing the sub-task on each sub-task in the holding area of the stage in accordance with the scheduling policy of the stage (col. 3 lines 11-25; col. 22 lines 1-19; col. 29 lines 31-55).

11. Choquier teaches the invention as claimed, including the following limitations not shown by Lee:

the computer system having a cache (col. 4 line 54 - col. 5 line 3); and

maintaining data locality in the cache for the sub-task (col. 4 line 54 - col. 5 line 3).

12. As per claim 13, Lee teaches the invention as claimed, including the method of claim 12, wherein the stage permits an instance of itself to be created on only a single processor in the computer system at a time (col. 40 lines 18-63).

13. As per claim 14, Lee teaches the invention as claimed, including the method of claim 12, wherein the stage includes a local data area, and wherein the stage regulates which processor is permitted to create an instance of it based on the part of the local data area is required to be accessed (col. 29 lines 31-55; col. 40 lines 18-63).

14. As per claim 19, Lee teaches the invention as claimed, including a system for executing a procedure on a computer, wherein the procedure is divided into a plurality of sub-tasks, the system comprising:

a computer-readable medium having stored thereon a plurality of work packets, each work packet including data usable to perform an iteration of a sub-task of the plurality of sub-tasks (col. 29 lines 31-55; col. 30 lines 5-12);

a computer-readable medium having stored thereon a plurality of stages, there being at least one stage for each sub-task, each stage comprising:

a holding area for holding a batch of the plurality of work packets (col. 3 lines 11-25; col. 22 lines 1-19); and

a scheduling policy (col. 3 lines 11-25; col. 22 lines 1-19); and

a processor for identifying a stage of the plurality of stages and performing an iteration of the stage's sub-task on each of the batch of work packets in accordance with the scheduling policy of the stage (col. 29 lines 31-55; col. 30 lines 5-12).

15. Choquier teaches the invention as claimed, including the following limitations not shown by Lee:

the computer system having a cache (col. 4 line 54 - col. 5 line 3); and

maintaining data locality in the cache for each sub-task (col. 4 line 54 - col. 5 line 3).

16. As per claim 22, Choquier teaches the invention as claimed, including the system of claim 19, wherein the identified stage has a local data area that is divided into sections, and wherein the processor determines whether to perform the sub-task of the stage based on the section of the local data area to which each work packet of the batch will require access (col. 5 line 67 - col. 6 line 8).

17. As per claim 23, Lee teaches the invention as claimed, including the system of claim 19, wherein each work packet contains instructions necessary to perform the sub-task of the stage at which it is held (col. 29 lines 31-55).

18. As per claim 25, Lee teaches the invention as claimed, including the system of claim 19, wherein each stage contains instructions necessary to perform its sub-task (col. 29 lines 31-55).

19. As per claim 26, Lee teaches the invention as claimed, including the system of claim 19, wherein the holding area of each stage is one of a plurality of holding areas for the stage, and wherein each of the plurality of holding areas of a stage is associated with one of the plurality of processors (col. 3 lines 11-25; col. 22 lines 1-19).

20. As per claim 27, Lee teaches the invention as claimed, including the system of claim 19, wherein the holding area is a queue (col. 3 lines 11-25; col. 22 lines 1-19).

21. As per claim 28, Lee teaches the invention as claimed, including the system of claim 19, wherein the holding area is a priority queue (col. 19 lines 40-64).

22. As per claim 29, Lee teaches the invention as claimed, including the system of claim 19, wherein the holding area is a stack (col. 3 lines 11-25; col. 22 lines 1-19).

23. As per claim 30, Lee teaches the invention as claimed, including a computer-readable medium having stored thereon computer-executable instructions for a method of performing a task on a computer system, wherein the task comprises a plurality of sub-tasks, the method comprising:

(a) instantiating a plurality of stages, the plurality of stages comprising at least one stage for each of the plurality of sub-tasks (col. 3 lines 11-25; col. 22 lines 1-19), the method comprising:

a holding area (col. 3 lines 11-25; col. 22 lines 1-19); and

a scheduling policy (col. 3 lines 11-25; col. 22 lines 1-19);

(b) receiving a plurality of requests for the task (col. 8 lines 26-48);

(c) for each of the requests, storing in a work packet data for performing a sub-task of the task (col. 29 lines 31-55);

(d) storing each work packet in the holding area of the at least one stage for the sub-task (col. 8 lines 26-48);

(e) executing the sub-task on each of the work packets in the holding area in accordance with the scheduling policy of the at least one stage for the sub-task while refraining from executing other sub-tasks of the task (col. 3 lines 11-25; col. 22 lines 1-19; col. 29 lines 31-55); and

(f) repeating steps c, d, and e for each sub-task of the task until all of the sub-tasks of the task are completed for each request (col. 29 lines 31-55; col. 30 lines 5-12).

24. Choquier teaches the invention as claimed, including the following limitations not shown by Lee:

the computer system having a cache (col. 4 line 54 - col. 5 line 3); and

maintaining locality of instructions and data in the cache (col. 4 line 54 - col. 5 line 3).

25. As per claim 31, Lee teaches the invention as claimed, including the computer-readable medium of claim 30, wherein each sub-task has a type of work packet defined for it, wherein the work packet defined for the sub-task includes data and functions for performing the sub-task (col. 29 lines 31-55).

26. As per claim 32, Lee teaches the invention as claimed, including the computer-readable medium of claim 30, wherein the holding area is a queue (col. 3 lines 11-25; col. 22 lines 1-19).

27. As per claim 33, Lee teaches the invention as claimed, including the computer-readable medium of claim 30, wherein the holding area is a stack (col. 3 lines 11-25; col. 22 lines 1-19).

28. As per claim 36, Lee teaches the invention as claimed, including a computer-readable medium having stored thereon computer-executable instructions for a method of performing a task on a computer system, wherein the task comprises a plurality of sub-tasks, the method comprising:

creating an instance of a stage for each sub-task (col. 3 lines 11-25; col. 22 lines 1-19), wherein the stage comprises:

a holding area (col. 3 lines 11-25; col. 22 lines 1-19); and

a scheduling policy (col. 3 lines 11-25; col. 22 lines 1-19);

placing one or more work packets in the holding area (col. 29 lines 31-55), each work packet corresponding to an iteration of the sub-task required for the task and containing data for performing the sub-task (col. 29 lines 31-55; col. 30 lines 5-12); and

performing the sub-task on each work packet in the holding area of the stage in accordance with the scheduling policy of the stage (col. 3 lines 11-25; col. 22 lines 1-19; col. 29 lines 31-55).

29. Choquier teaches the invention as claimed, including the following limitations not shown by Lee:

the computer system having a cache (col. 4 line 54 - col. 5 line 3); and

maintaining locality of instructions and data in the cache (col. 4 line 54 - col. 5 line 3).

30. As per claim 37, Lee teaches the invention as claimed, including the computer-readable medium of claim 36, wherein the stage permits an instance to be created on only a single processor in the computer system at a time (col. 40 lines 18-63).

31. As per claim 38, Lee teaches the invention as claimed, including the computer-readable medium of claim 36, wherein the stage includes a local data area, and wherein the stage regulates which processor is permitted to create an instance of it based on the part of the local data area required to be accessed (col. 29 lines 31-55; col. 40 lines 18-63).

32. **Claims 5, 7-11, 15, 17, 20, 24, 34-35, 39, and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Choquier in view of Austvold et al. (USPN 6,266,708) (hereinafter Austvold).**

33. As per claim 5, Austvold teaches the invention as claimed, including the following limitations not shown by Lee or Choquier:

the method of claim 1, wherein at least one of the executed work packets is a parent work packet, the method further comprising:

creating a child work packet for the parent work packet (col. 3 lines 18-45); and

performing a sub-task of the plurality of sub-tasks on the child work packet (col. 3 lines 18-45).

34. It would have been obvious to one of ordinary skill in the art to combine Lee and Choquier with Austvold since Austvold teaches an exemplary model for representing tasks, such that relationships can be derived among tasks, increasing the message passing abilities such that communication among related tasks is easily achieved. Since Lee is related to multiple network tasks working in conjunction with each other, a model for passing information that is output from one task to an input for another task would be highly beneficial. A step of storing results can be eliminated by simply cascading processes, and the parent-child relationship of tasks in Austvold facilitates this.

35. As per claim 7, Austvold teaches the invention as claimed, including the method of claim 1, wherein step (c) further comprises storing in the work packet a pointer to the data for performing the sub-task (col. 24 lines 1-18).

36. As per claims 8-9, "Official Notice" is taken that the sub-task being performed on the child work packet may be either different or the same as the sub-task performed on the parent work packet would have been obvious to one of ordinary skill in the art. Austvold teaches that the parent and child packets have an inheritance relationship (col. 22 line 60 - col. 23 line 5). It is well known, especially for object-oriented systems, that when an inheritance relationship exists, the functional components of an object may either leave the parent's components intact or override them. In the former case, the data in the child would be the same as the parent, whereas in the latter case, the data would be different.

37. As per claim 10, Austvold teaches the invention as claimed, including the method of claim 5, wherein the sub-task being performed on the parent work packet is halted until the sub-task being performed on the child work packet is completed (col. 20 line 36 - col. 21 line 4).

38. As per claim 11, Austvold teaches the invention as claimed, including the method of claim 5, wherein the sub-task being performed on the parent work packet is halted until a predefined event occurs (col. 20 line 36 - col. 21 line 4).

39. As per claim 15, Austvold teaches the invention as claimed, including the method of claim 12, wherein for at least one of the stage instances created, there is at least one work packet that is a parent work packet, the method further comprising:

creating a child work packet for the parent work packet (col. 3 lines 18-45);

sending the child work packet to another stage instance (col. 3 lines 18-45); and

at the other stage instances, performing a sub-task of the plurality of sub-tasks on the child work packet (col. 3 lines 18-45).

40. As per claim 17, Austvold teaches the invention as claimed, including the method of claim 12, wherein each work packet contains at least one pointer to data for performing the sub-task (col. 24 lines 1-18).

41. As per claim 20, Austvold teaches the invention as claimed, including the system of claim 19, wherein the processor is one of a plurality of processors and wherein at least one stage of the plurality is instantiated on at least two of the plurality of processors (col. 1 line 64 - col. 2 line 4).

42. As per claim 24, Austvold teaches the invention as claimed, including the system of claim 19, wherein each work packet contains at least one pointer to instructions necessary to perform the sub-task of the stage at which it is held (col. 24 lines 1-18).

43. As per claim 34, Austvold teaches the invention as claimed, including the computer-readable medium of claim 30, wherein at least one of the executed work packets is a parent work packet, the method further comprising:

creating a child work packet for the parent work packet (col. 3 lines 18-45); and

performing a sub-task of the plurality of sub-tasks on the child work packet (col. 3 lines 18-45).

44. As per claim 35, Austvold teaches the invention as claimed, including the computer-readable medium of claim 30, wherein step (c) further comprises storing in the work packet a pointer to the data for performing the sub-task (col. 24 lines 1-18).

45. As per claim 39, Austvold teaches the invention as claimed, including the computer-readable medium of claim 36, wherein for at least one of the stage instances created, there is at least one work packet that is a parent work packet, the method further comprising:

creating a child work packet for the parent work packet (col. 3 lines 18-45);

sending the child work packet to another stage instance (col. 3 lines 18-45); and

at the other stage instances, performing a sub-task of the plurality of sub-tasks on the child work packet (col. 3 lines 18-45).

46. As per claim 41, Austvold teaches the invention as claimed, including the computer-readable medium of claim 36, wherein each work packet contains at least one pointer to data for performing the sub-task (col. 24 lines 1-18).

47. **Claims 16, 21, and 40 rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Choquier in view of Pase et al. (USPN 6,566,321) (hereinafter Pase).**

48. As per claim 16, Pase teaches the invention as claimed, including the following limitations not shown by Lee or Choquier:

the method of claim 12, wherein the holding area includes a stack and a queue, and the method further comprises:

for each work packet received by at least one stage instance, putting the work packet in the stack if the work packet originated from the processor on which the instance of the stage is created (col. 4 lines 38-59), and putting the work packet in the queue if the work packet originated from another processor (col. 3 lines 43-47).

49. It would have been obvious to one of ordinary skill in the art to combine Lee and Choquier with Pase since efficient memory management facilitates parallel processing by reducing message passing overhead. The integration of shared memory in a parallel processing environment reduces the amount of message passing needed, thereby increasing the overall processing capacity of the system.

50. As per claim 21, Pase teaches the invention as claimed, including the system of claim 19, wherein the holding area of the identified stage includes a queue and a stack, wherein the queue is for holding work packets that originated from processors other than the one on which an instance of the identified stage is created (col. 4 lines 38-59), wherein the stack is for holding work packets that originated from the processor on which the instance of the stage is created (col. 3 lines 43-47).

51. As per claim 40, Pase teaches the invention as claimed, including the computer-readable medium of claim 36, wherein the holding area includes a stack and a queue, and the method further comprises:

for each work packet received by at least one stage instance, putting the work packet in the stack if the work packet originated from the processor on which the instance of the stage is created (col. 4 lines 38-59), and putting the work packet in the queue if the work packet originated from another processor (col. 3 lines 43-47).

Response to Arguments

52. Applicant's arguments with respect to claims 1-5, 7-17, and 19-41 have been considered but are moot in view of the new grounds of rejection.

Conclusion

53. Applicant's amendment necessitated the new grounds of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the

advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Syed J Ali whose telephone number is (571) 272-3769. The examiner can normally be reached on Mon-Fri 8-5:30, 2nd Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Meng-Ai T An can be reached on (571) 272-3756. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Syed Ali
August 30, 2004

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